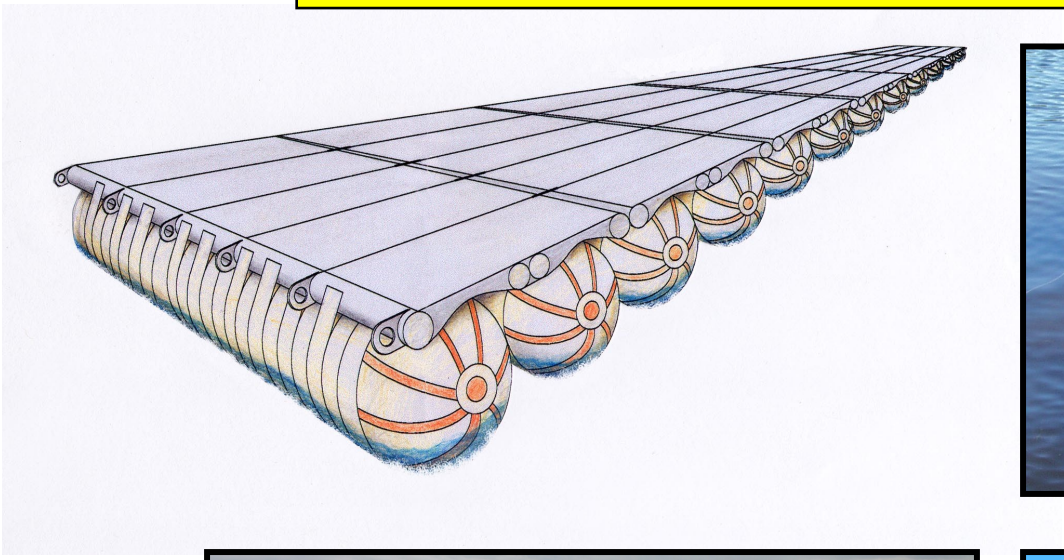
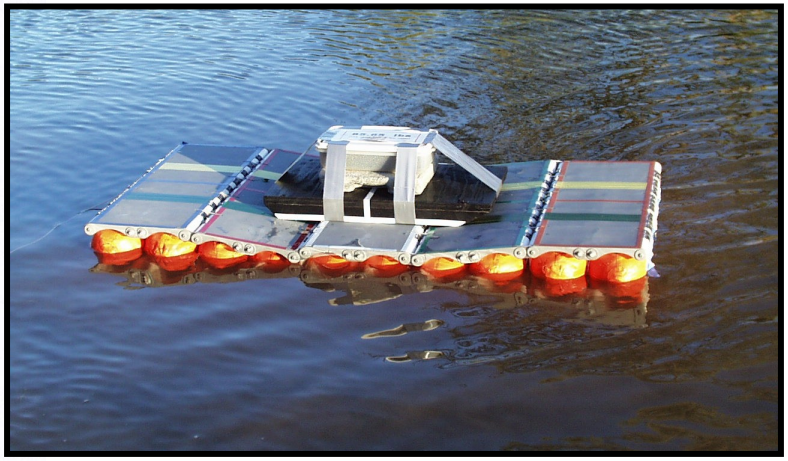
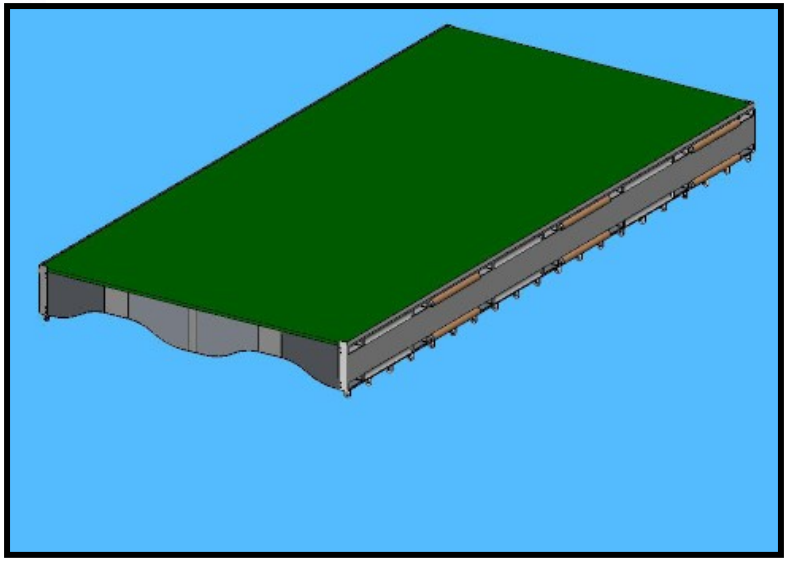
Lightweight Modular Causeway Section (LMCS) R&D Study

LMCS Tube Stiffened Design Concept

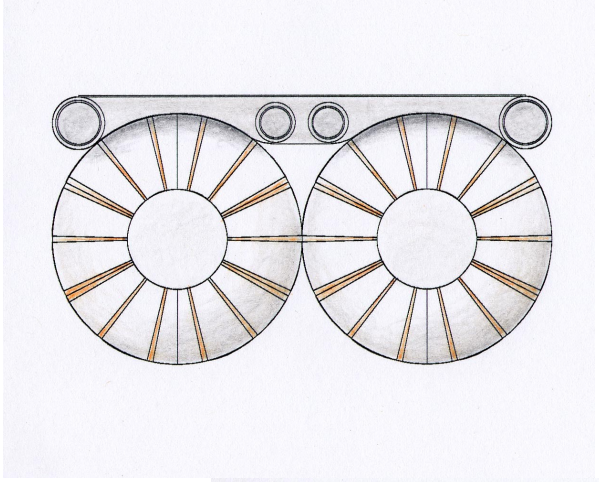


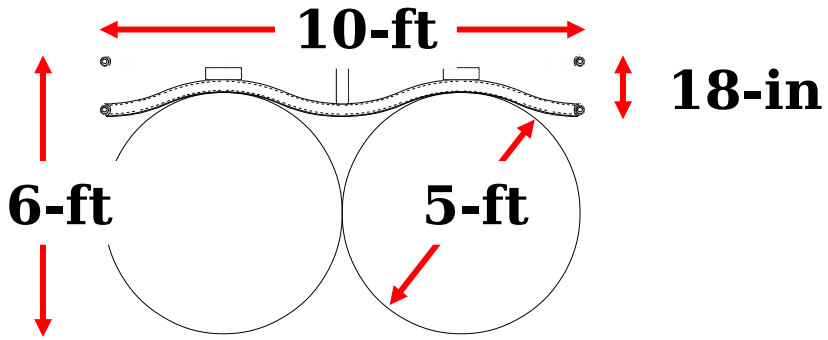


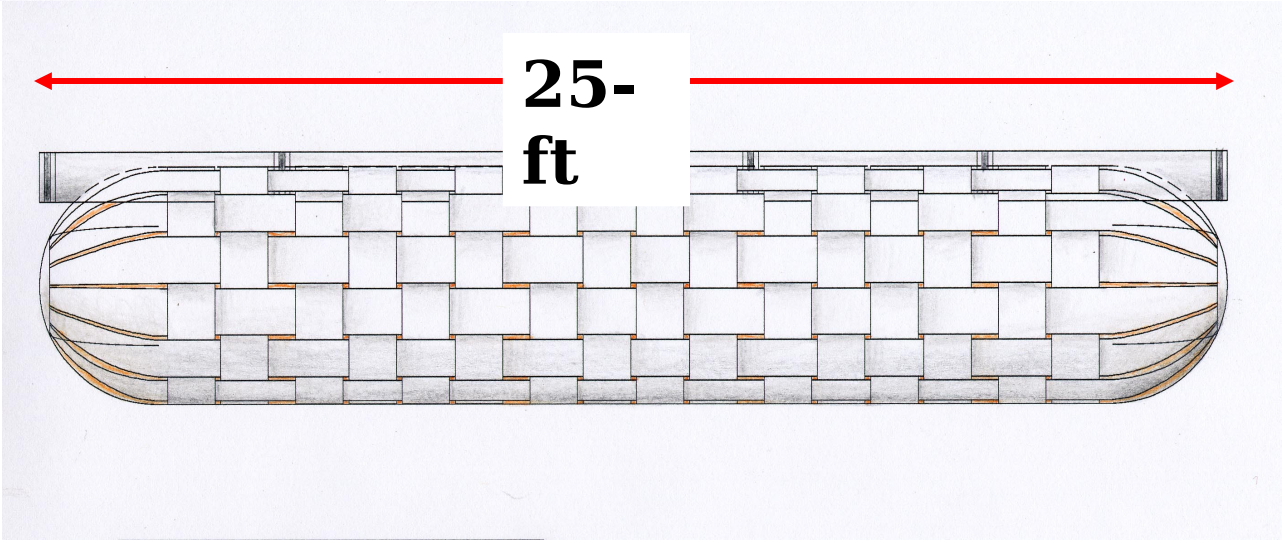


Lightweight Modular Causeway Section (LMCS) R&D Study

Full-scale LMCS Module

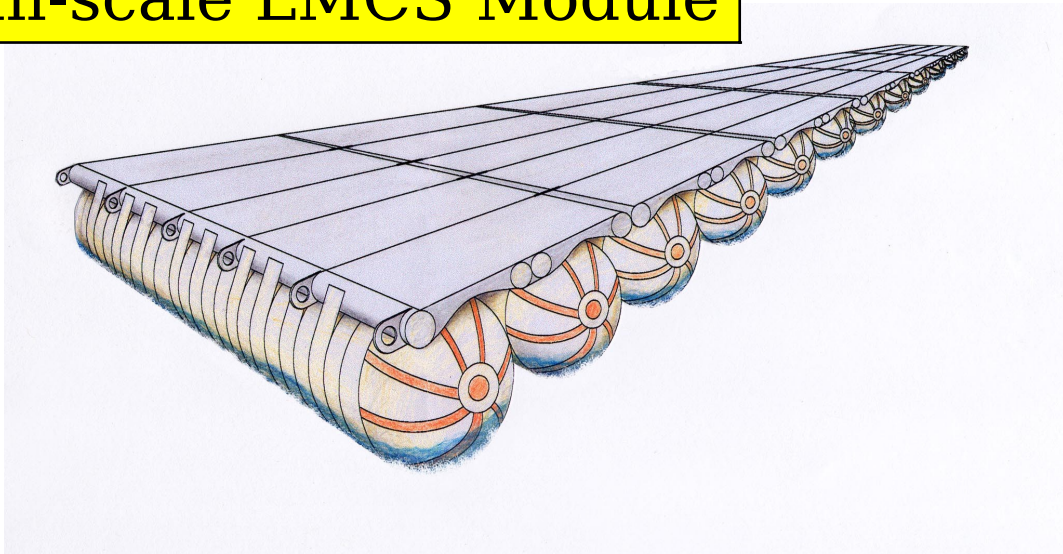


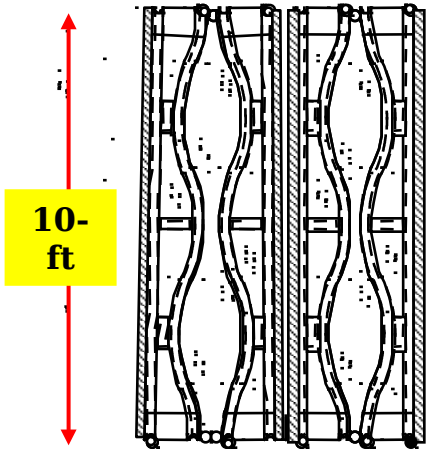




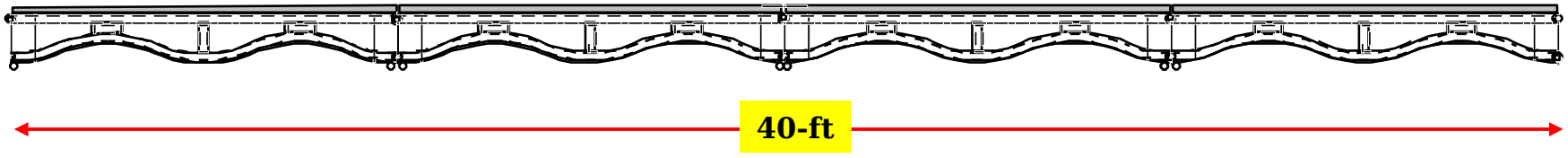
Lightweight Modular Causeway Section (LMCS) R&D Study

Full-scale LMCS Module



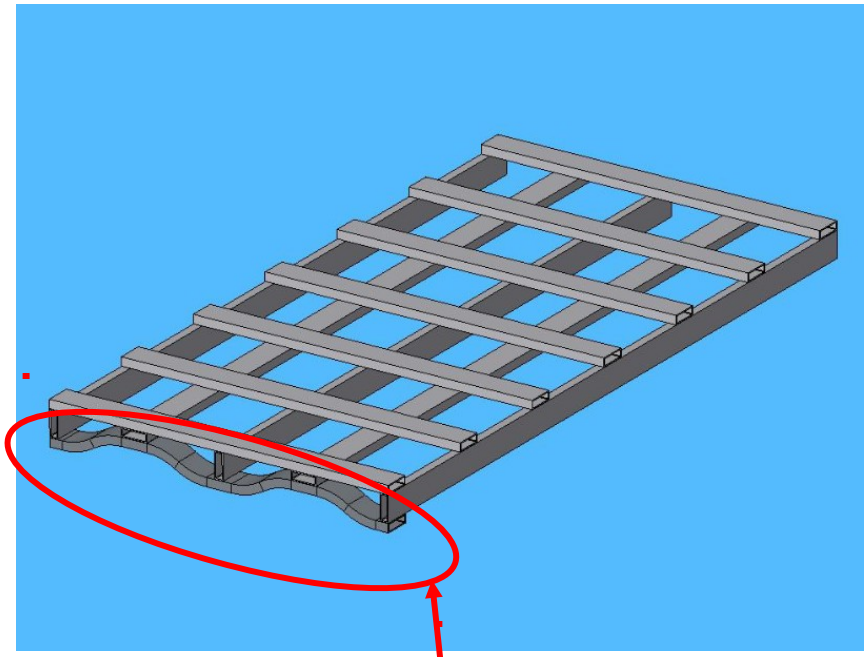


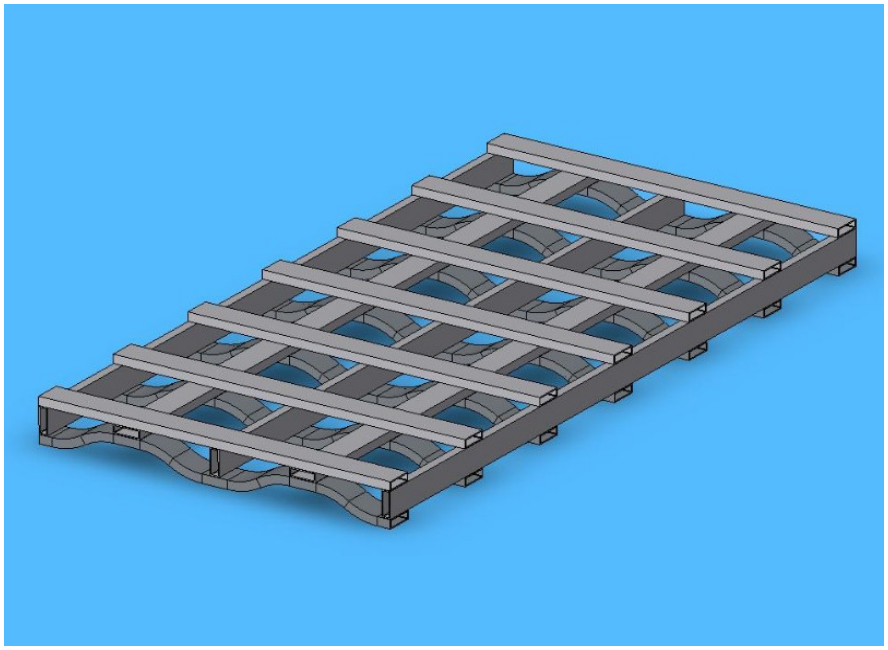
MCS - Hard Structure Deployed

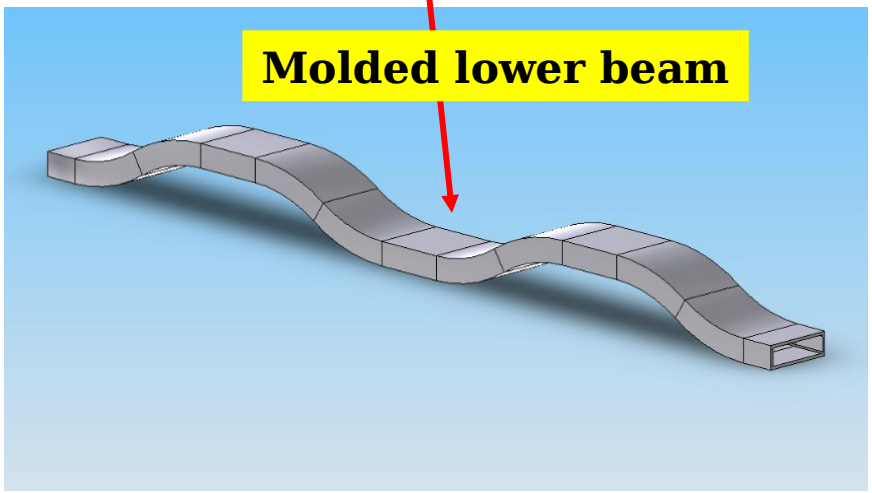


Lightweight Modular Causeway Section (LMCS)

1/3rd Scale LMCS Model Design Development





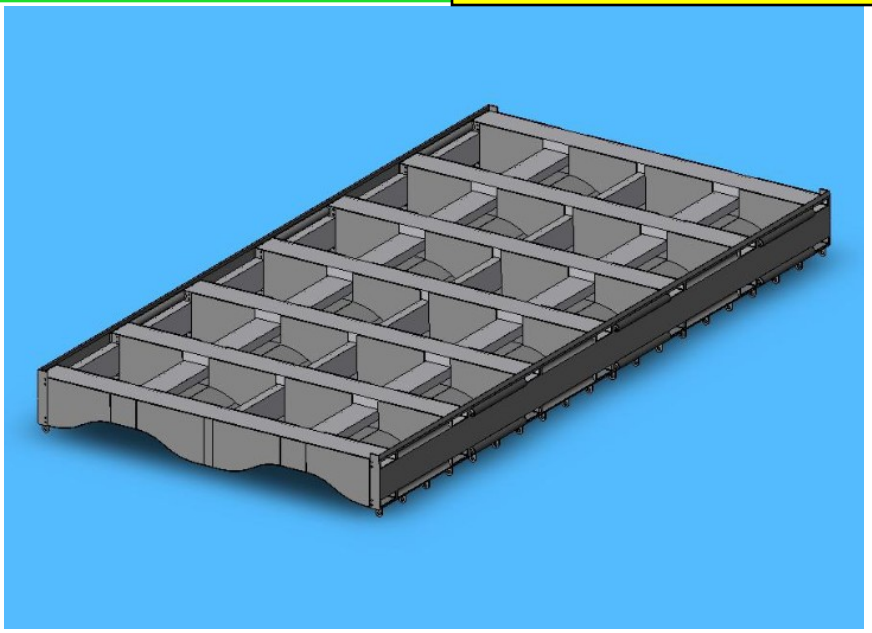


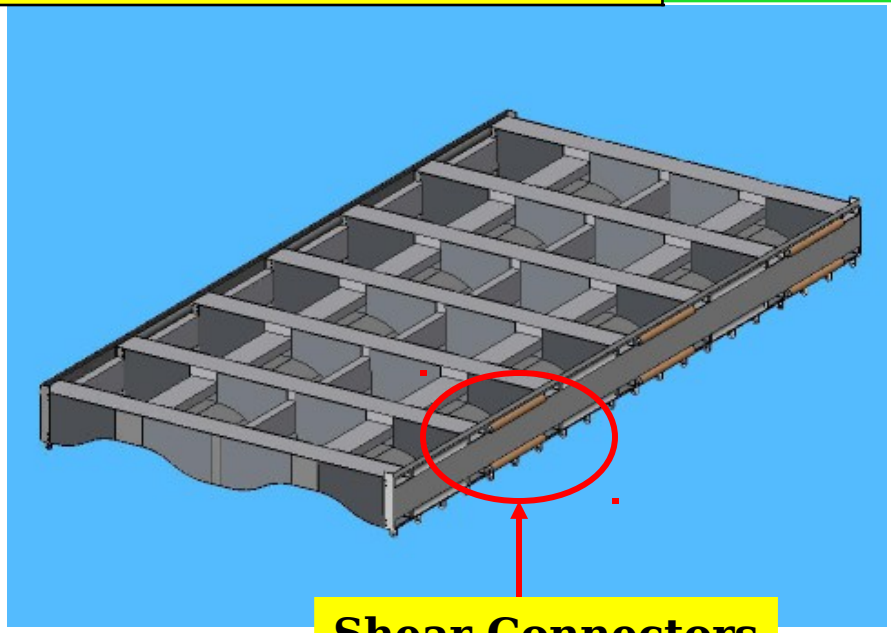
Primary Structure:

Extruded aluminum beams
3-in x 1-in x 1/8-in wall
1/8-in thick plate reinforcement
Aluminum top and bottom skin

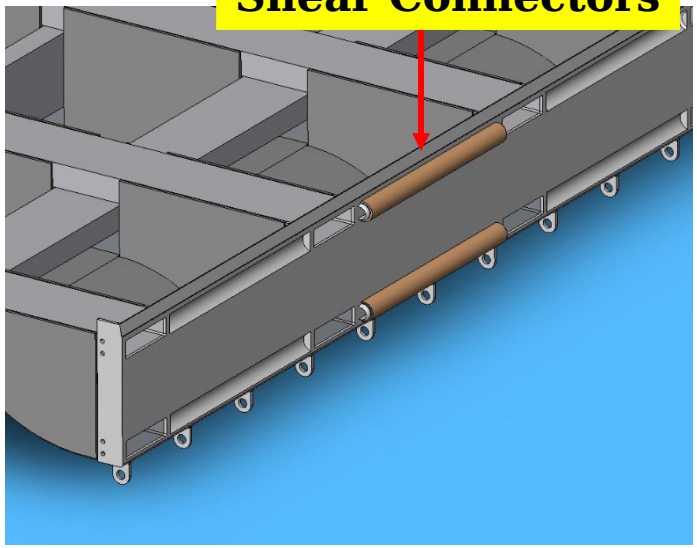
Lightweight Modular Causeway Section (LMCS)

1/3rd Scale LMCS Model Design Development





Shear Connectors

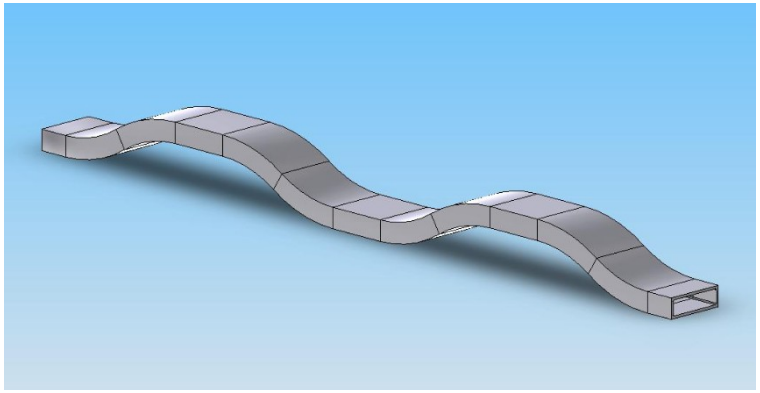


Fabrication:

3M Aluminum-to-aluminum tape
Stainless steel rivets (anti-peel)
End plates bolted to primary structure
Closed cell foam-filled cavities

Lightweight Modular Causeway Section (LMCS) R&D Study

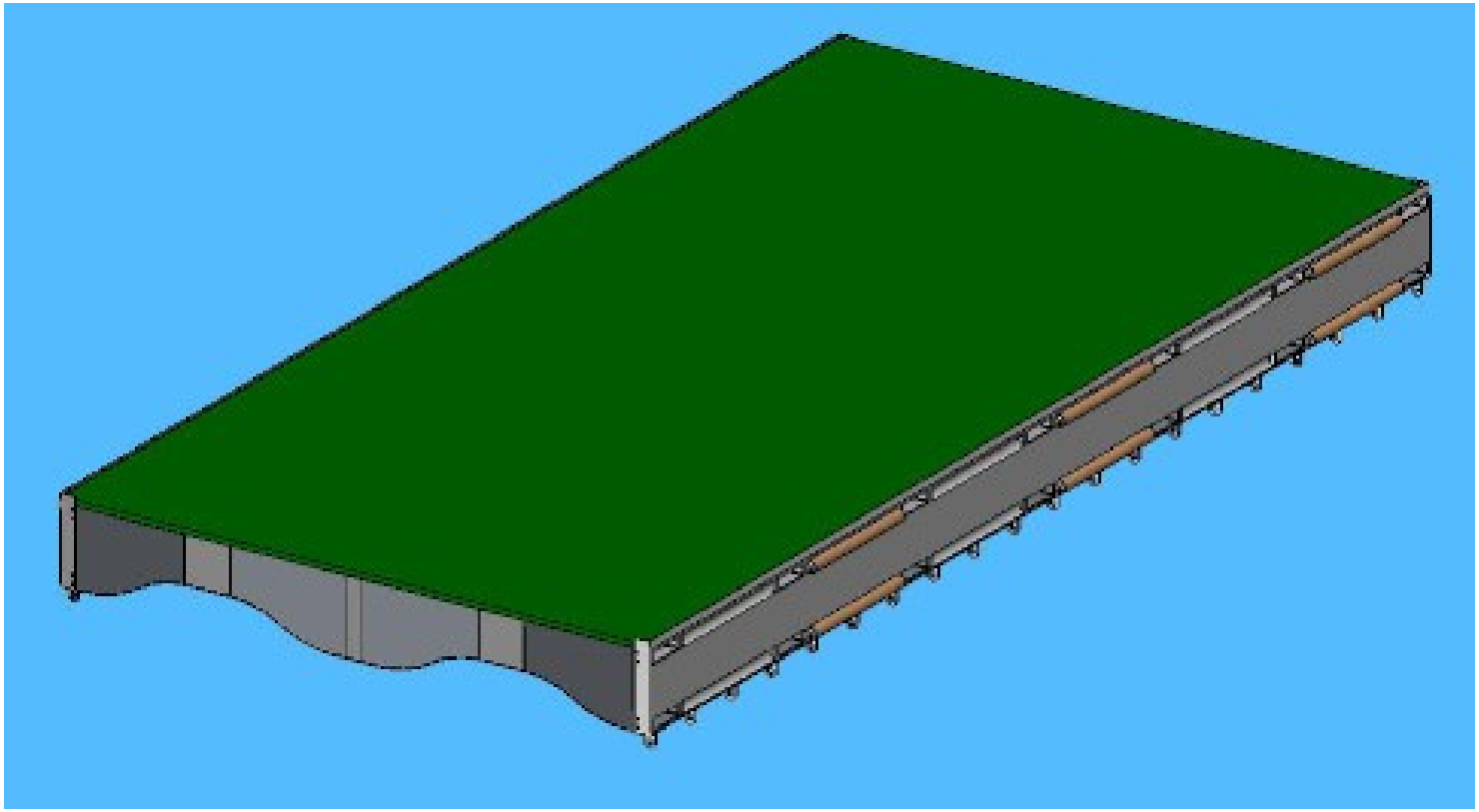
1/3rd Scale LMCS Model Design Development



Special Fabrication:
Molded lower beam hydraulic - custom built press.

Lightweight Modular Causeway Section (LMCS) R&D Study

1/3rd Scale LMCS Model Design Development

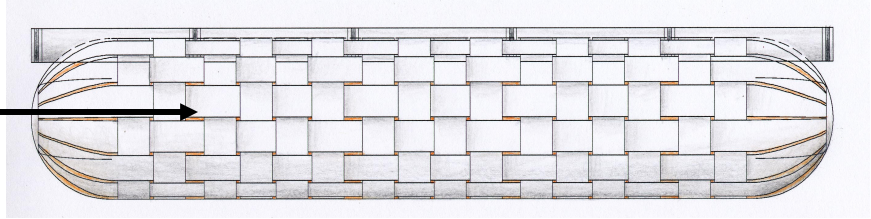


Removable top deck surface - plywood with elastomer coated anti-slip surface

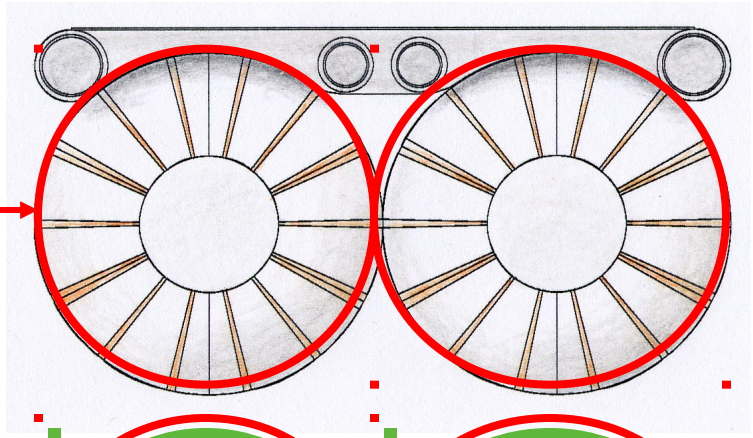
Lightweight Modular Causeway Section (LMCS) R&D Study

Air Containment Development

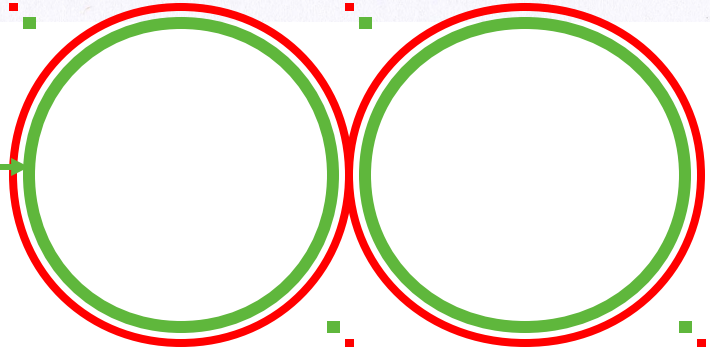
Tough exoskeleton of woven polyester webbing



Inner shell of elastomer coated fabric

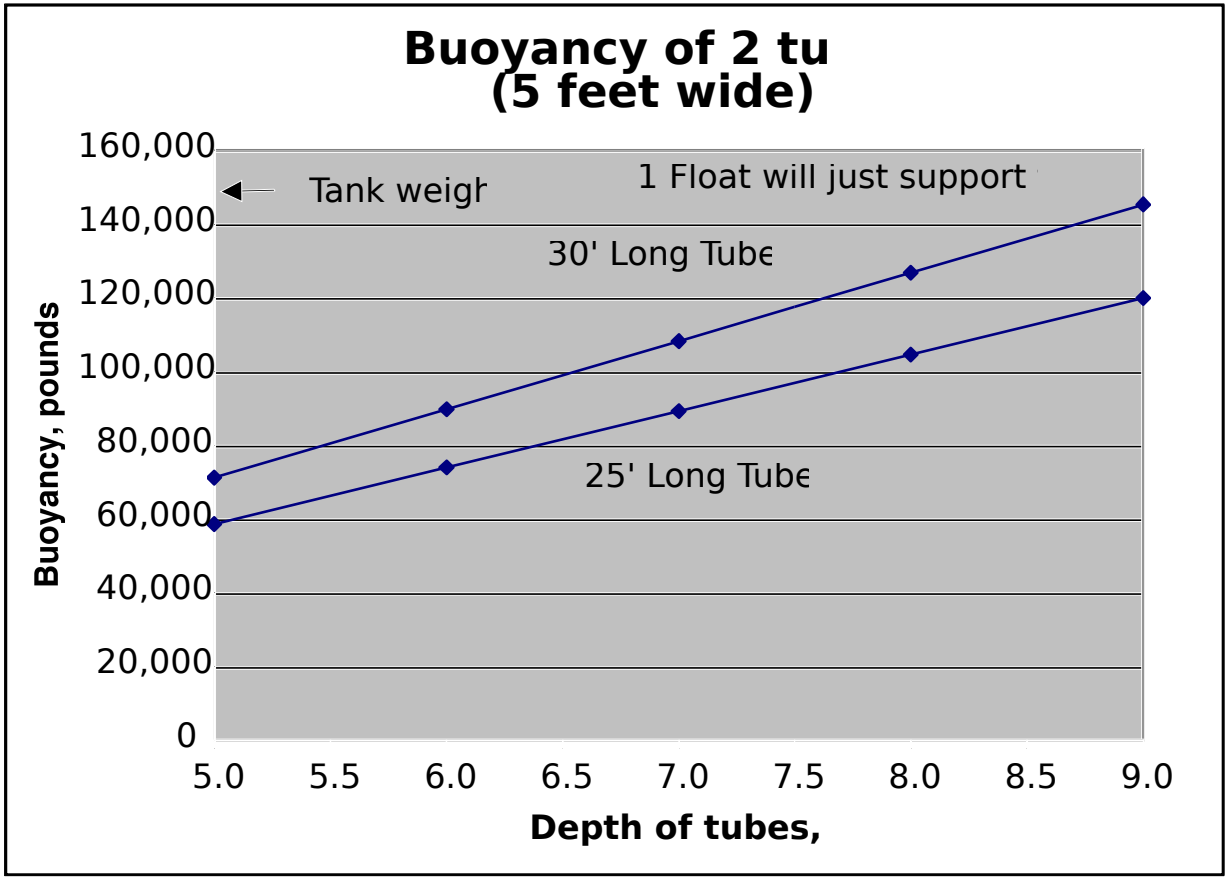


Primary air containment bladder



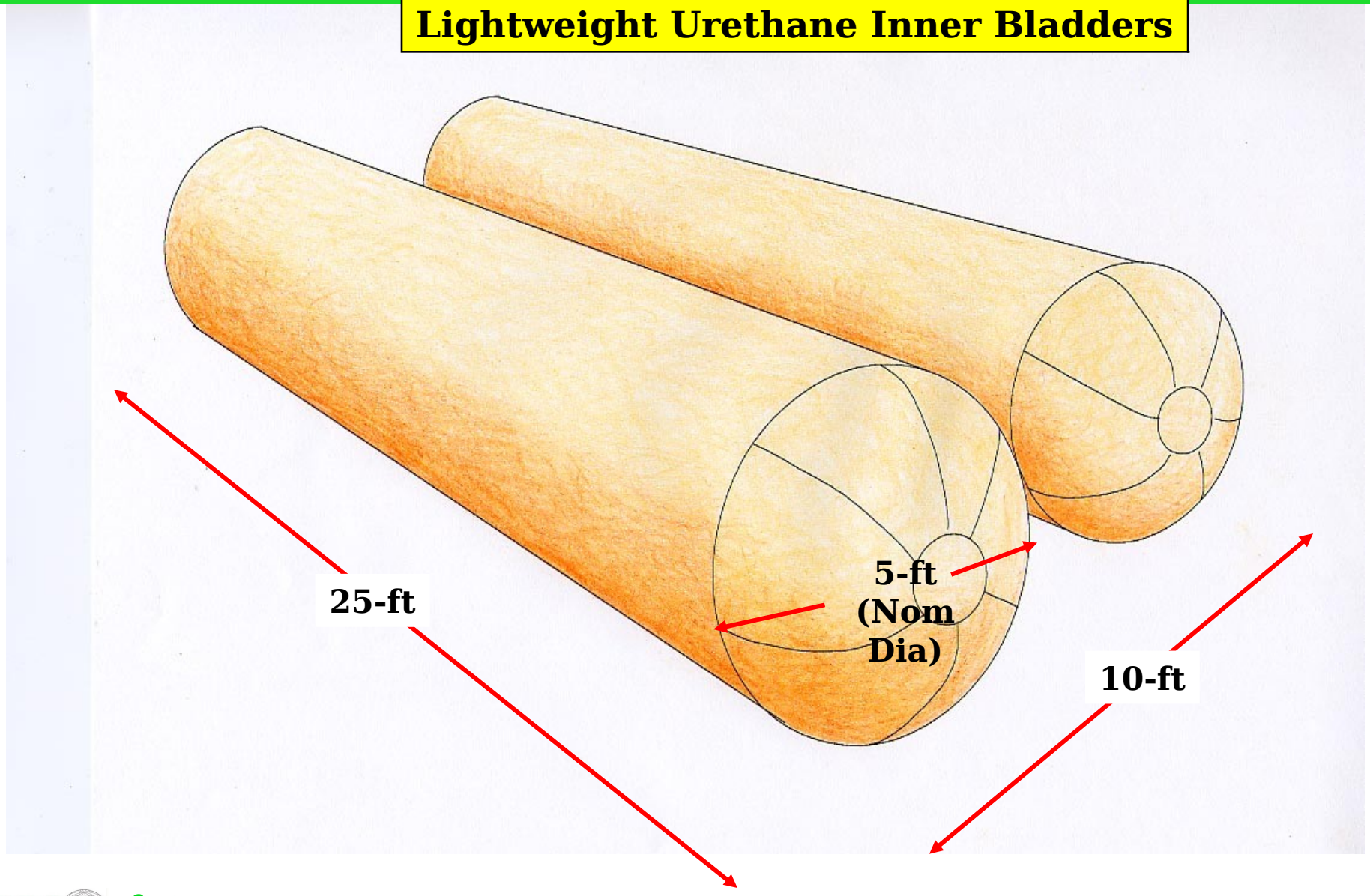
Lightweight Modular Causeway Section (LMCS) R&D Study

Buoyancy Selection Considerations



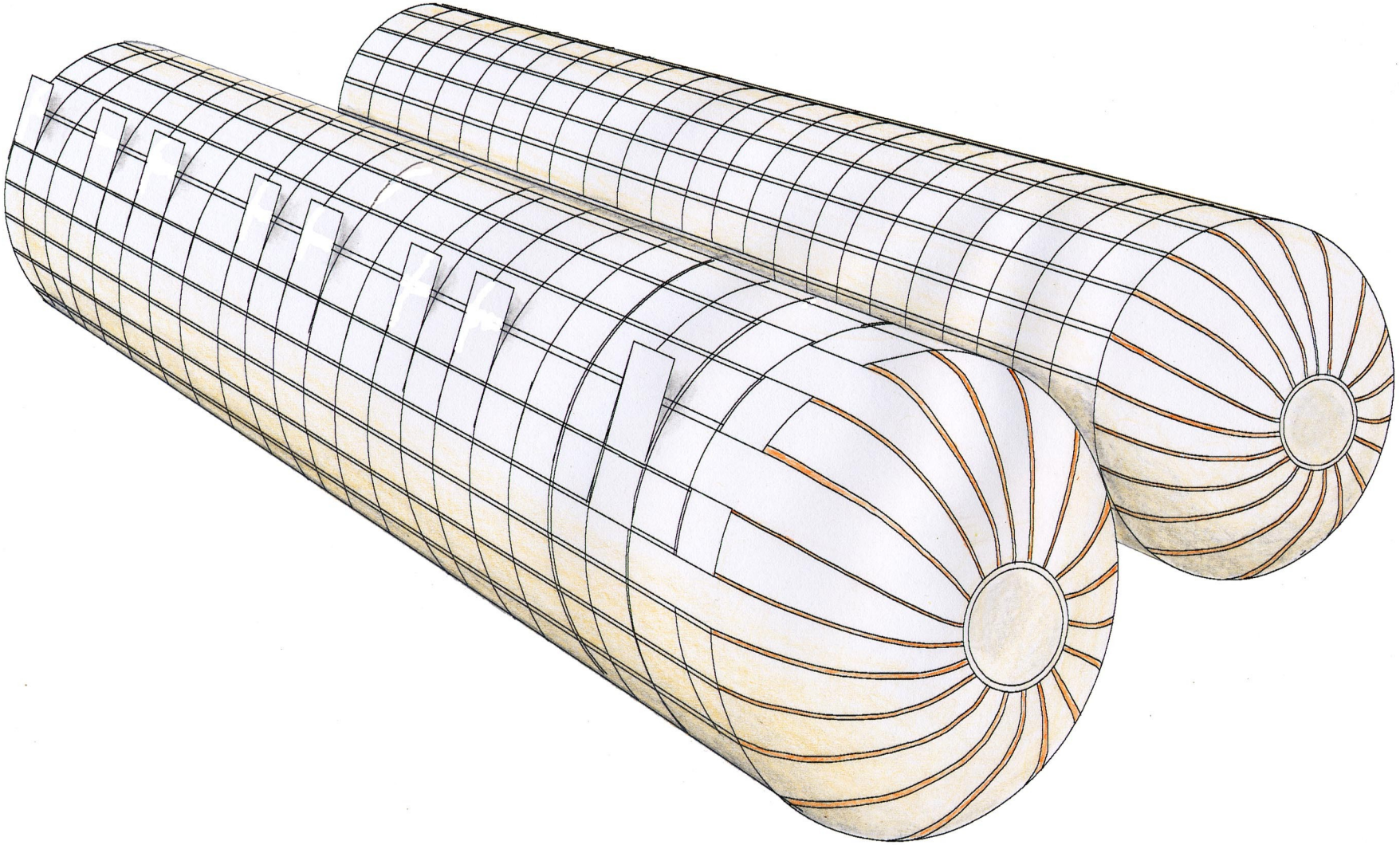
Lightweight Modular Causeway Section (LMCS) R&D Study

Lightweight Urethane Inner Bladders



Lightweight Modular Causeway Section (LMCS) R&D Study

Heavy-duty PVC shell encased within woven polyester webbing



ERDC Engineer Research and Development Center

Quantum Engineering Design, Inc.

February 2005

Lightweight Modular Causeway Section (LMCS) R&D Study

Heavy-duty PVC shell encased within woven polyester webbing

Example of LMCS type buoyancy structure

Rapidly Installed Breakwater (RIB) 6-ft dia technology demonstrator

ERDC Engineer Research and Development Center

Quantum Engineering Design, Inc.

Lightweight Modular Causeway Section (LMCS) R&D Study

1/3rd Scale LMCS Model Design Development

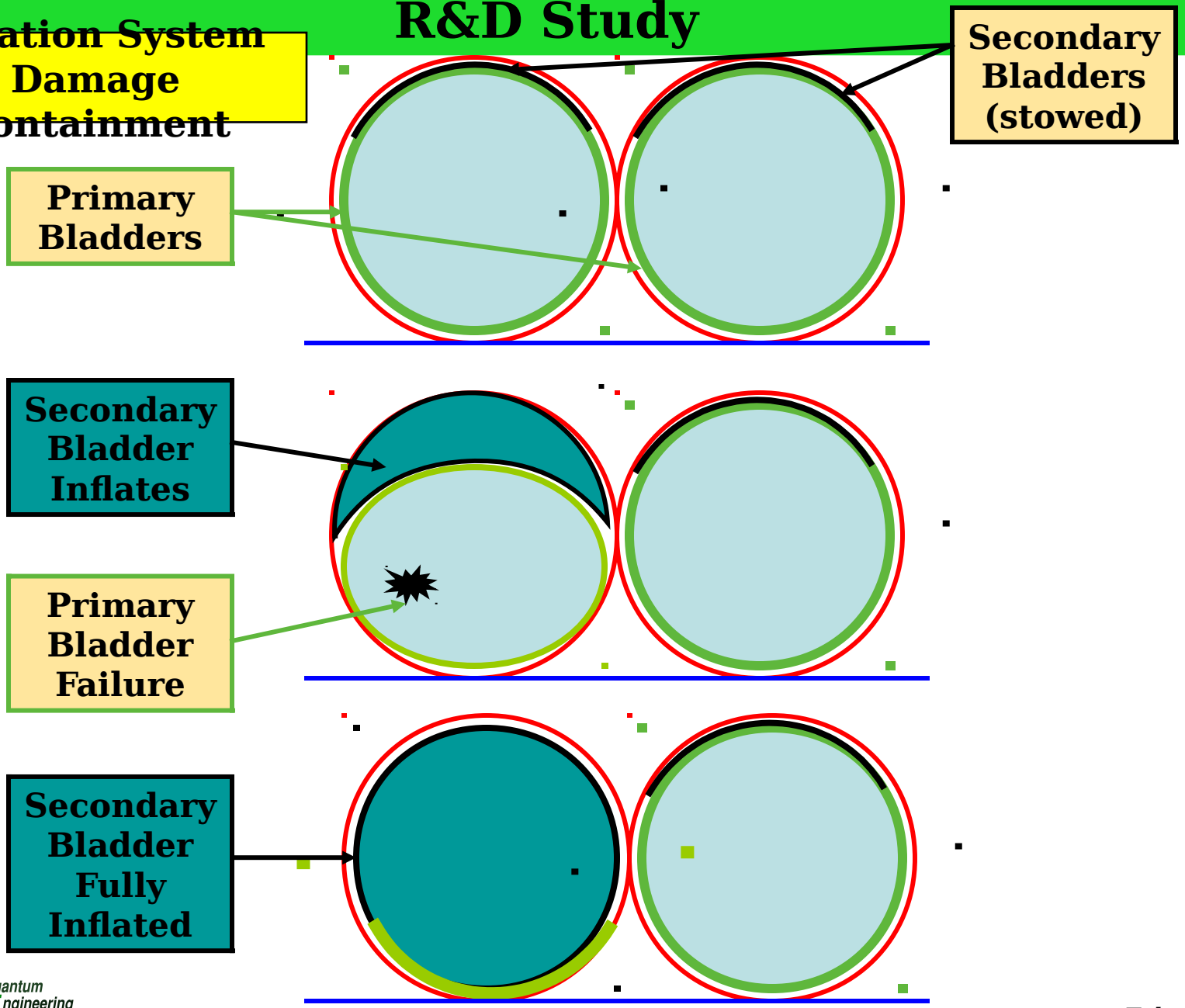
Webbing Matrix Design Development

- Conducted review of available off-the-shelf webbing suitable for 1/3rd scale model.
- Designed and fabricated 1/3rd scale webbing matrix lay-up tooling

Nylon webbing T7939
Breaking Strength
3,000 lbs

Lightweight Modular Causeway Section (LMCS) R&D Study

Inflation System Damage Containment

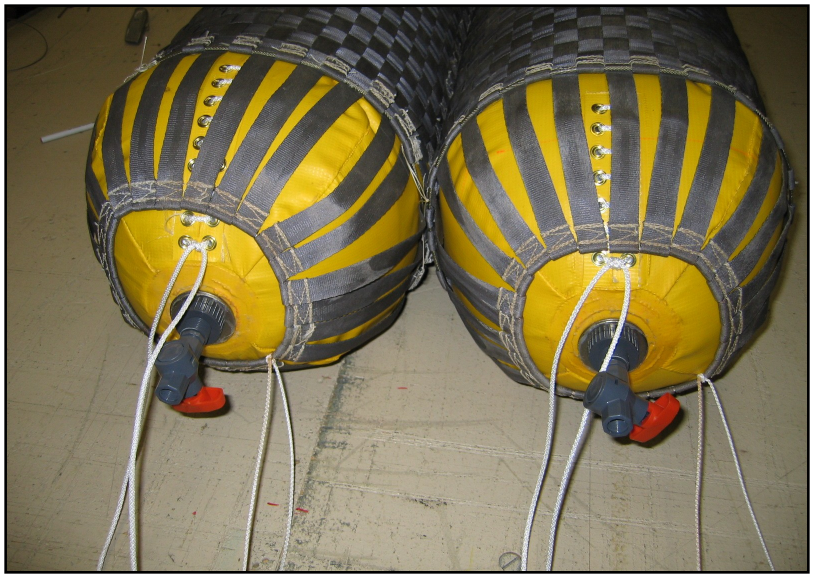


Lightweight Modular Causeway Section (LMCS) R&D Study

Small Scale Damage Containment Demonstration

Lightweight Modular Causeway Section (LMCS) R&D Study

Small Scale Damage Containment Demonstration



Lightweight Modular Causeway Section (LMCS) R&D Study

Questions ?